CLAIMS

WHAT IS CLAIMED IS:

1. A semiconductor light-emitting device comprising:

a substrate made of group III-V nitride semiconductor;

a first n-type semiconductor layer containing indium and formed over a main surface of the substrate; and

a light-emitting layer formed between the first n-type semiconductor layer and the substrate.

2. The device of claim 1,

wherein the substrate is made of gallium nitride.

3. The device of claim 1,

wherein the substrate is a substrate whose main surface is polished.

4. The device of claim 3,

wherein the substrate is a substrate whose main surface is etched.

5. The device of claim 3,

wherein the substrate is a substrate whose main surface is planarized.

6. The device of claim 1,

wherein the light-emitting layer has a multiple quantum well structure formed by alternately stacking a quantum well layer and a barrier layer, and

the quantum well layer has a thickness of 1 to 2.5 nm inclusive.

7. The device of claim 1,

wherein the first n-type semiconductor layer is made of a compound whose general formula is represented by $In_aAl_bGa_{1-a-b}N$ ($0<a<1$, $0\leq b<1$, $a+b\leq 1$).

8. The device of claim 7,

wherein the aluminum content of the first n-type semiconductor layer is 3% or lower.

9. The device of claim 1,

wherein the first n-type semiconductor layer has a thickness of 10 nm to 1 μm inclusive.

10. The device of claim 1, further comprising a second n-type semiconductor layer formed between the substrate and the first n-type semiconductor layer.

11. The device of claim 10,

wherein the second n-type semiconductor layer is made of a compound whose general formula is represented by $In_cAl_dGa_{1-c-d}N$ ($0 \leq c < 1$, $0 \leq d < 1$, $c+d < 1$).

12. The device of claim 11,

wherein the second n-type semiconductor layer is an n-type contact layer.

13. The device of claim 8, further comprising a third n-type semiconductor layer formed between the first n-type semiconductor layer and the light-emitting layer.

14. The device of claim 13,

wherein the third n-type semiconductor layer is an n-type contact layer.

15. The device of claim 1, further comprising a fourth n-type semiconductor layer formed between the first n-type semiconductor layer and the light-emitting layer.

16. The device of claim 15,

wherein the fourth n-type semiconductor layer is made of a compound whose general formula is represented by $Al_eGa_{1-e}N$ ($0 \leq e < 1$).

17. The device of claim 16,

wherein the fourth n-type semiconductor layer is a cladding layer.

18. The device of claim 17,

wherein the cladding layer has a thickness of 5 to 200 nm inclusive.

19. The device of claim 1, further comprising:

an n-type contact layer which is formed between the substrate and the light-emitting layer and a portion of which is exposed;

an n-side electrode formed on the exposed portion of the n-type contact layer;

an n-type cladding layer formed between the first n-type semiconductor layer and the light-emitting layer;

a p-type semiconductor layer formed on the light-emitting layer; and

a p-side electrode formed over the p-type semiconductor layer,

wherein the device is mounted with an element formation surface thereof facing a submounte for mounting.

20. A illuminating device comprising the multiple semiconductor light-emitting devices of claims 1 through 19.